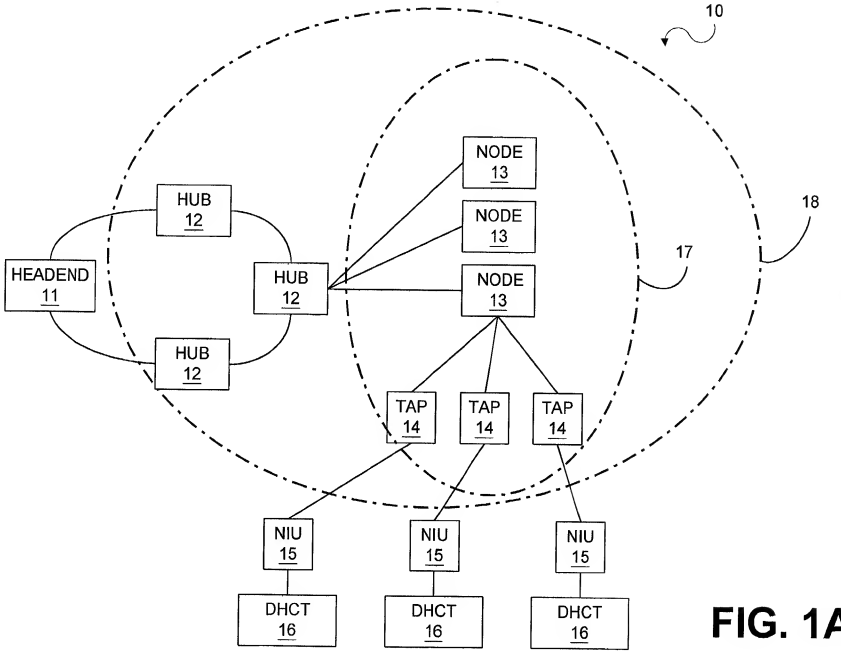

FIG. 1A

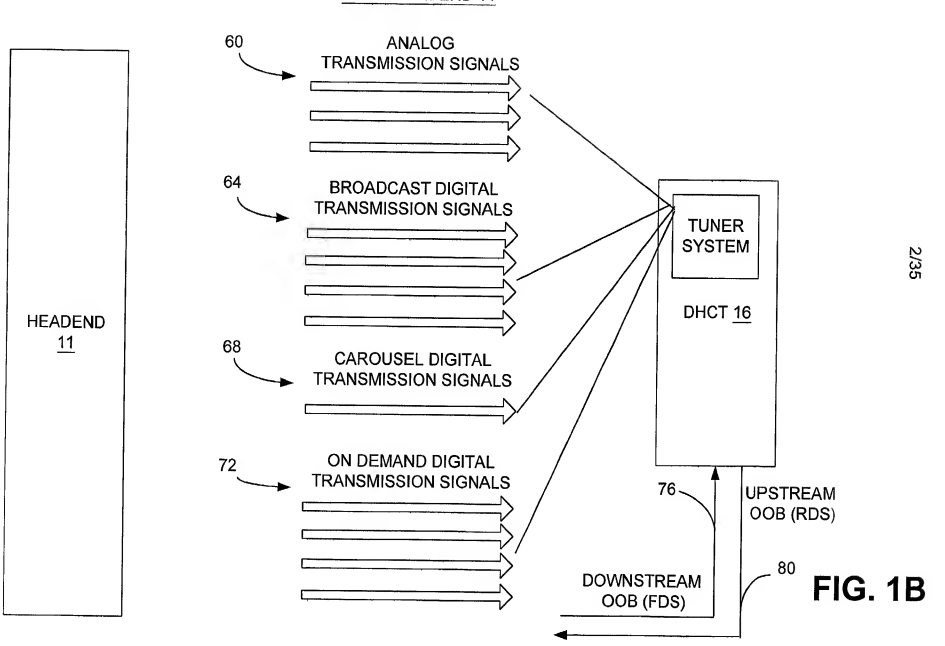
FROM HEADEND 11
HEADEND 11
60
ANALOG TRANSMISSION SIGNALS
64
BROADCAST DIGITAL TRANSMISSION SIGNALS
68
CAROUSEL DIGITAL TRANSMISSION SIGNALS
72
ON DEMAND DIGITAL TRANSMISSION SIGNALS
TUNER SYSTEM
DHCT 16
76
UPSTREAM OOB (RDS)
80
DOWNSTREAM OOB (FDS)

FIG. 1B

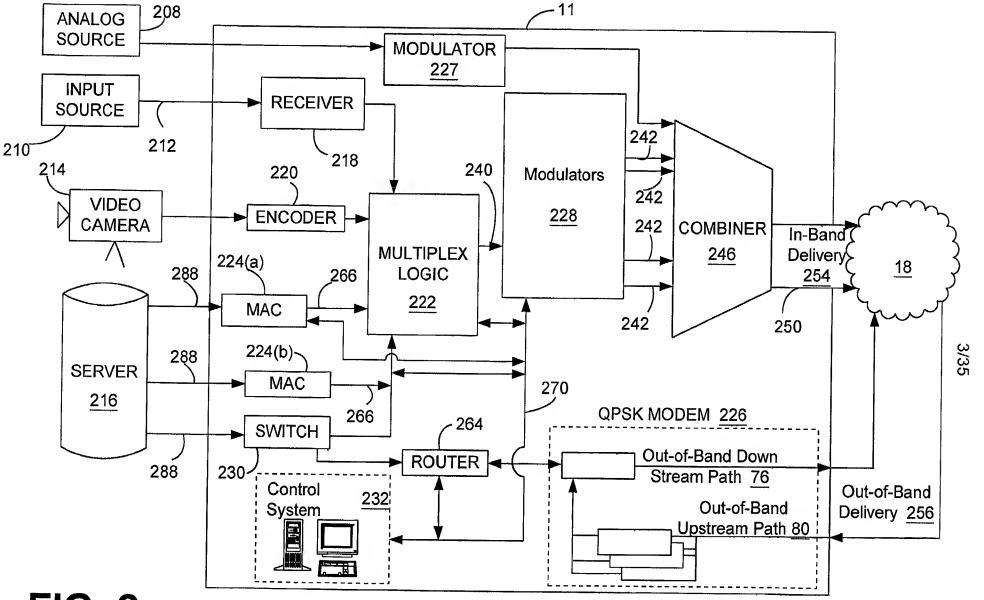

FIG. 2

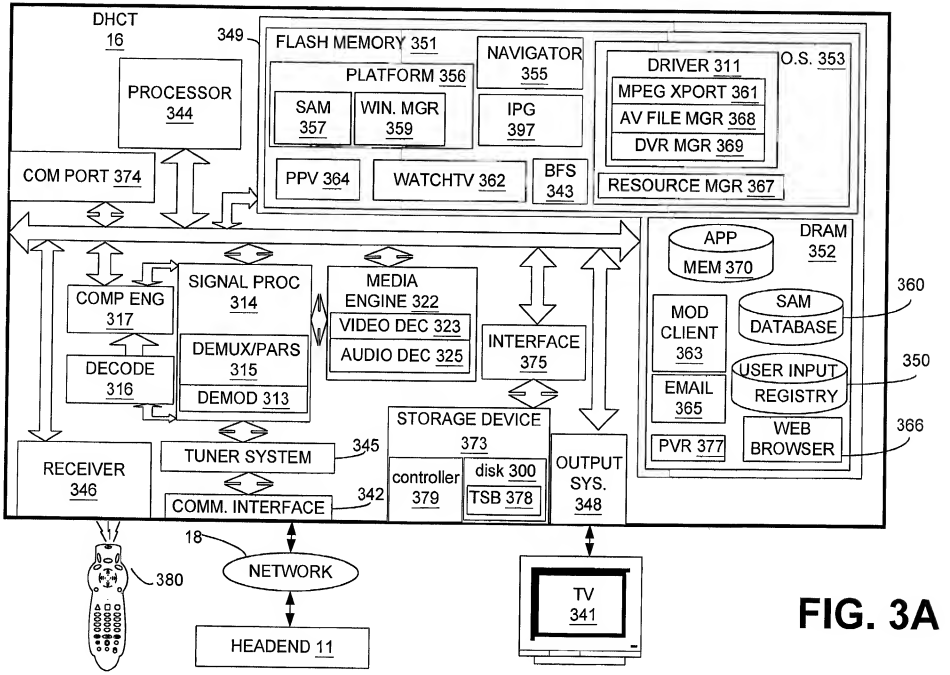
DHCT
16
349
FLASH MEMORY 351
NAVIGATOR
355
PLATFORM 356
SAM
357
WIN. MGR
359
IPG
397
DRIVER 311
O.S. 353
MPEG XPORT 361
AV FILE MGR 368
DVR MGR 369
PROCESSOR
344
COM PORT 374
PPV 364
WATCHTV 362
BFS
343
RESOURCE MGR 367
APP
MEM 370
DRAM
352
SIGNAL PROC
314
MEDIA
ENGINE 322
VIDEO DEC 323
AUDIO DEC 325
COMP ENG
317
DEMUX/PARS
315
DEMOD 313
DECODE
316
INTERFACE
375
MOD
CLIENT
363
SAM
DATABASE
360
USER INPUT
REGISTRY
350
EMAIL
365
PVR 377
WEB
BROWSER
366
STORAGE DEVICE
373
controller
379
disk 300
TSB 378
OUTPUT
SYS.
348
RECEIVER
346
TUNER SYSTEM
345
COMM. INTERFACE
342
18
NETWORK
380
HEADEND 11
TV
341

FIG. 3A

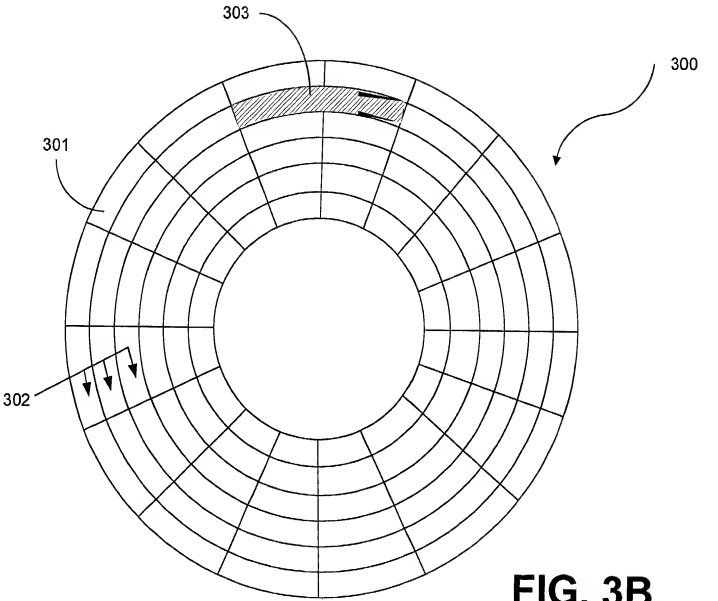

FIG. 3B

```
struct ProgramInfo
{
410  char    *filename;
415  bool    recorded;      /* 0 = do not permanently record */
420  int     handle;        /*  file handle, 0 = file closed      */
425  char    *guideData;    /* program description, title, times  */
430  time    startTime;     /* actual record start time           */
435  time    stopTime;      /* actual record stop time        */
437  int     startNPT;      /* start NPT for the media content instance*/
440  int     stopNPT;       /* stop NPT for the  media content instance*/
445  int     tsbHandle      /* handle for associated TSB      */
450  int     tsbStartNPT;   /* start NPT for associated TSB   */
455  int     tsbStopNPT;    /* stop NPT for associated TSB    */
/* additional data */
};
```

FIG. 4A

```
struct TSBprogramInfo
{
460  int    handle;      /* file handle, 0 = file closed        */
465  List   programs;    /* list of ProgramInfo                 */
470  int    startNPT;    /* start NPT for the TSB               */
475  int    recNPT;      /* current record NPT for the TSB */
/* additional data */
};
```

FIG. 4B

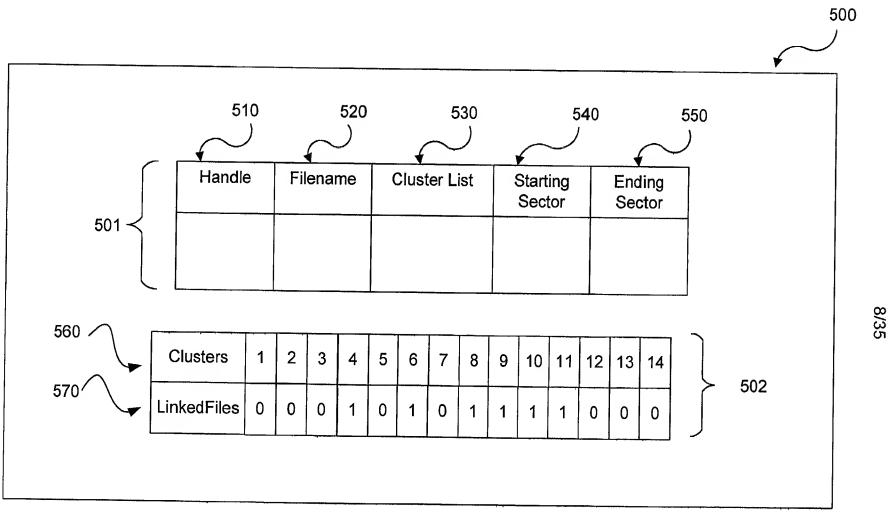
500
510
520
530
540
550
Handle
Filename
Cluster List
Starting Sector
Ending Sector
501
560
570
Clusters
LinkedFiles
1 2 3 4 5 6 7 8 9 10 11 12 13 14
0 0 0 1 0 1 0 1 1 1 1 0 0 0
502

FIG. 5A

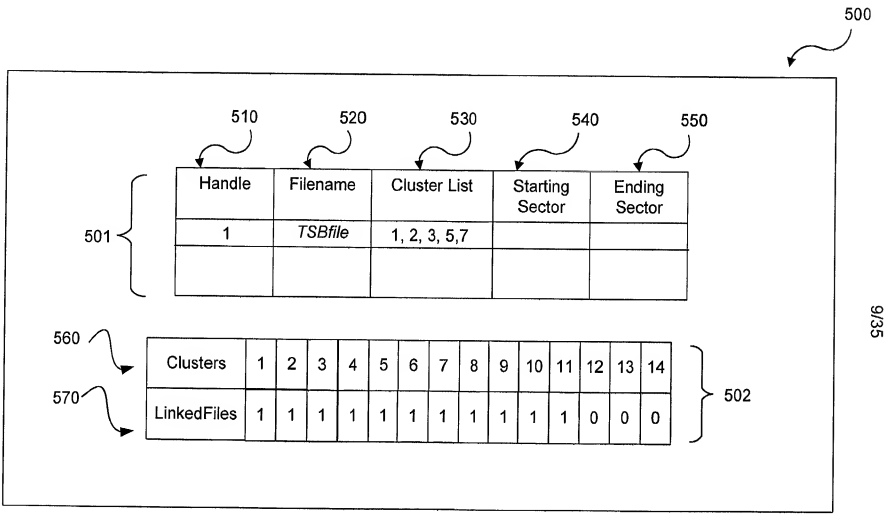
500
510
520
530
540
550
Handle
Filename
Cluster List
Starting Sector
Ending Sector
501
1
TSBfile
1, 2, 3, 5,7
560
570
Clusters
1 2 3 4 5 6 7 8 9 10 11 12 13 14
LinkedFiles
1 1 1 1 1 1 1 1 1 1 1 0 0 0
502

FIG. 5B

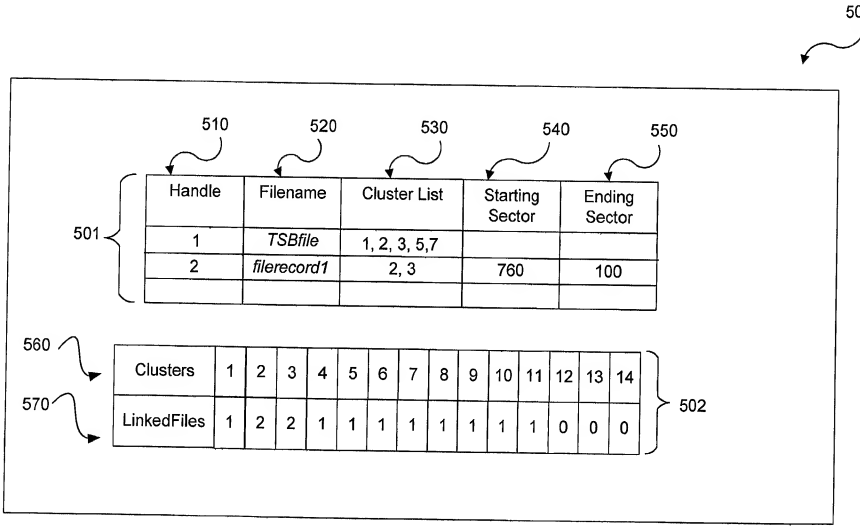
500
510
520
530
540
550
501
Handle
Filename
Cluster List
Starting Sector
Ending Sector
1
TSBfile
1, 2, 3, 5,7
2
filerecord1
2, 3
760
100
560
570
Clusters
1 2 3 4 5 6 7 8 9 10 11 12 13 14
LinkedFiles
1 2 2 1 1 1 1 1 1 1 1 0 0 0
502

FIG. 5C

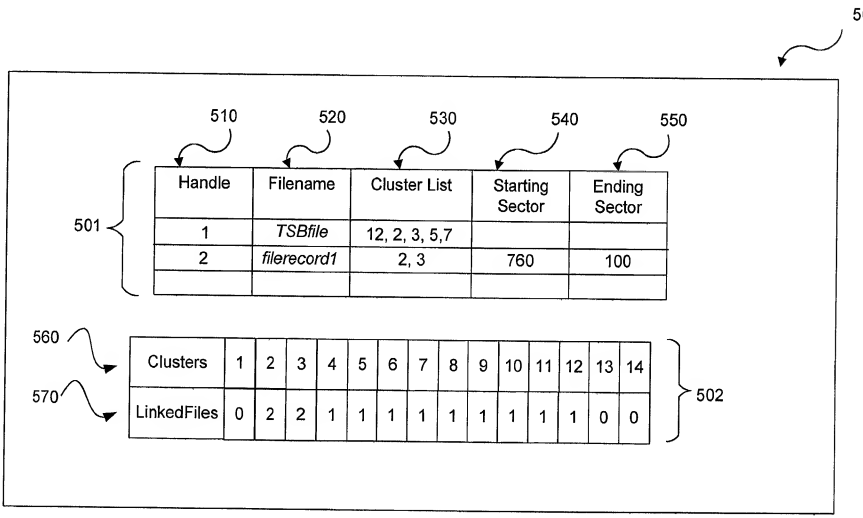
500
510
520
530
540
550
501
Handle
Filename
Cluster List
Starting Sector
Ending Sector
1
TSBfile
12, 2, 3, 5,7
2
filerecord1
2, 3
760
100
560
570
Clusters
1 2 3 4 5 6 7 8 9 10 11 12 13 14
LinkedFiles
0 2 2 1 1 1 1 1 1 1 1 1 0 0
502

FIG. 5D

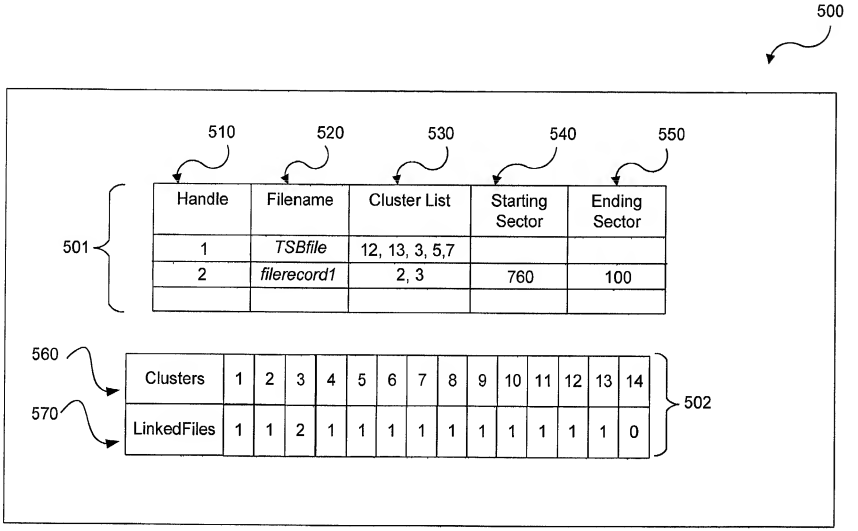
500
510
520
530
540
550
501
Handle
Filename
Cluster List
Starting Sector
Ending Sector
1
TSBfile
12, 13, 3, 5,7
2
filerecord1
2, 3
760
100
560
570
Clusters
1 2 3 4 5 6 7 8 9 10 11 12 13 14
LinkedFiles
1 1 2 1 1 1 1 1 1 1 1 1 1 0
502

FIG. 5E

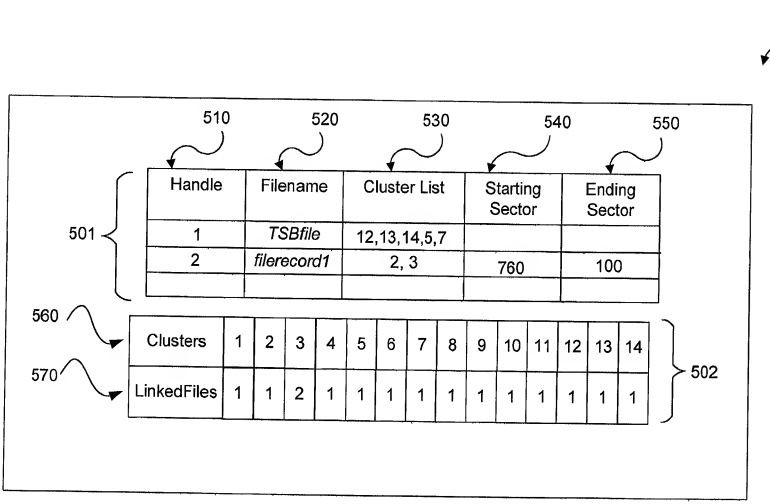
500
510
520
530
540
550
Handle
Filename
Cluster List
Starting Sector
Ending Sector
501
1
TSBfile
12,13,14,5,7
2
filerecord1
2, 3
760
100
560
Clusters
1 2 3 4 5 6 7 8 9 10 11 12 13 14
570
LinkedFiles
1 1 2 1 1 1 1 1 1 1 1 1 1
502

FIG. 5F

```
struct clusterInfo          /* cluster entry data in FAT */
{
        short numLinkedFiles;           /* number of linked files */
        /* additional data */

}
```

FIG. 6A

```
struct RecordedFileInfo
{
        ClusterList clusterList;    /* ordered list of clusters */
        unsigned    startingSector;
        unsigned  endingSector;
        /* additional data */
}
```

FIG. 6B

```
struct TSBfileInfo
{
        ClusterList clusterList;        /* ordered list of clusters

        /* additional data */
}
```

FIG. 6C

```
void dvrm_TimeShift (ui32 *handle, TV_ID tvId)
```

FIG. 7A

```
dvrm_Record (ui32 *handle, TV_ID tvId, char *filename, eDvr_Quality quality)
```

FIG. 7B

```
dvrm_TimeShiftRecord (ui32 *handle, ui32 *tsbHandle, char *filename, i32 startNpt, i32 stopNpt)
```

FIG. 7C

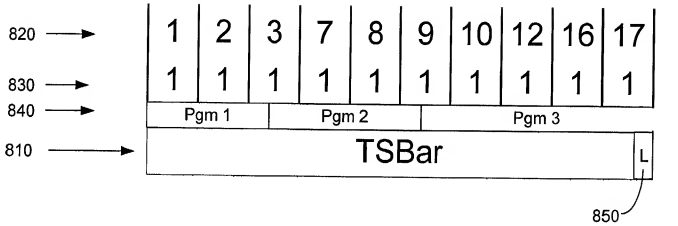
820
830
840
810
1
2
3
7
8
9
10
12
16
17
1
1
1
1
1
1
1
1
1
1
Pgm 1
Pgm 2
Pgm 3
TSBar
L
850

FIG. 8A

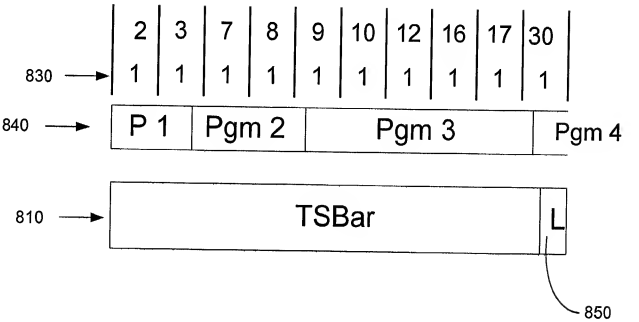
2
3
7
8
9
10
12
16
17
30
1
1
1
1
1
1
1
1
1
1
830
840
P 1
Pgm 2
Pgm 3
Pgm 4
810
TSBar
L
850

FIG. 8B

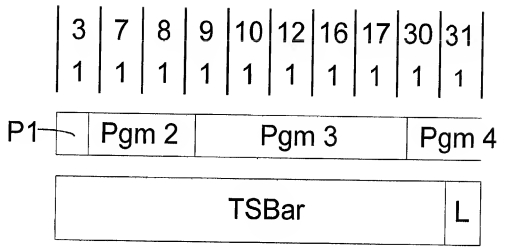

FIG. 8C

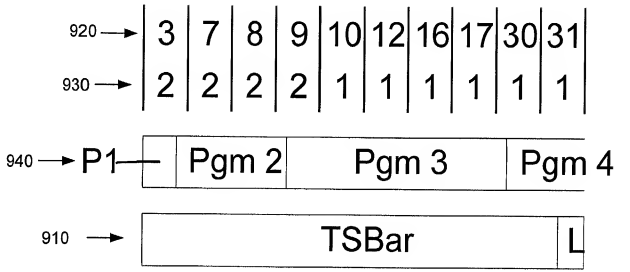
920
3
7
8
9
10
12
16
17
30
31
930
2
2
2
2
1
1
1
1
1
1
940
P1
Pgm 2
Pgm 3
Pgm 4
910
TSBar
L

FIG. 9A

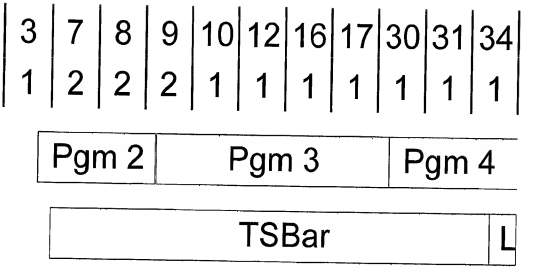

FIG. 9B

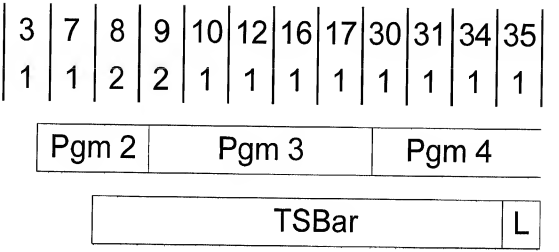
3
1
7
1
8
2
9
2
10
1
12
1
16
1
17
1
30
1
31
1
34
1
35
1
Pgm 2
Pgm 3
Pgm 4
TSBar
L

FIG. 9C

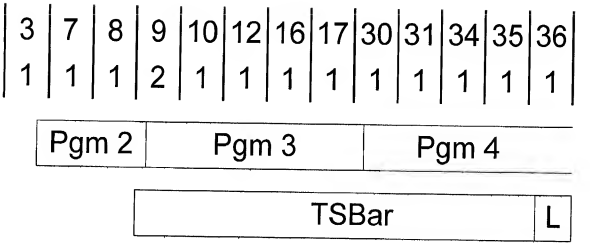
3 7 8 9 10 12 16 17 30 31 34 35 36
1 1 1 2 1 1 1 1 1 1 1 1 1
Pgm 2
Pgm 3
Pgm 4
TSBar
L

FIG. 9D

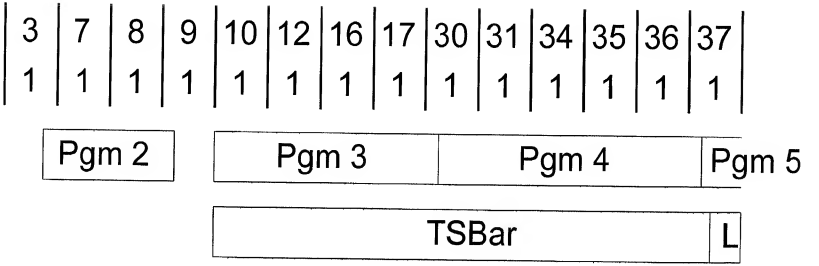
3
1
7
1
8
1
9
1
10
1
12
1
16
1
17
1
30
1
31
1
34
1
35
1
36
1
37
1
Pgm 2
Pgm 3
Pgm 4
Pgm 5
TSBar
L

FIG. 9E

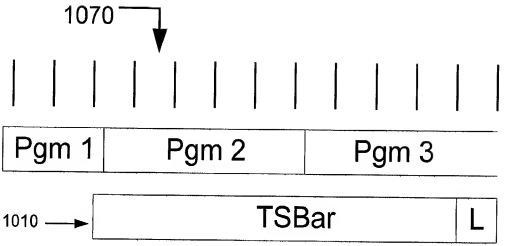

FIG. 10A

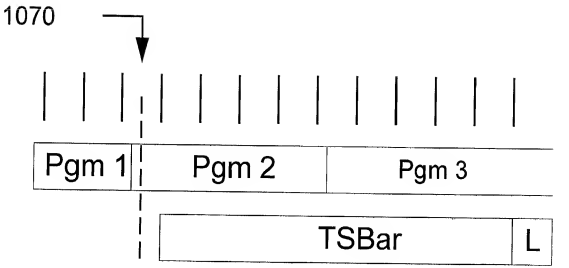

FIG. 10B

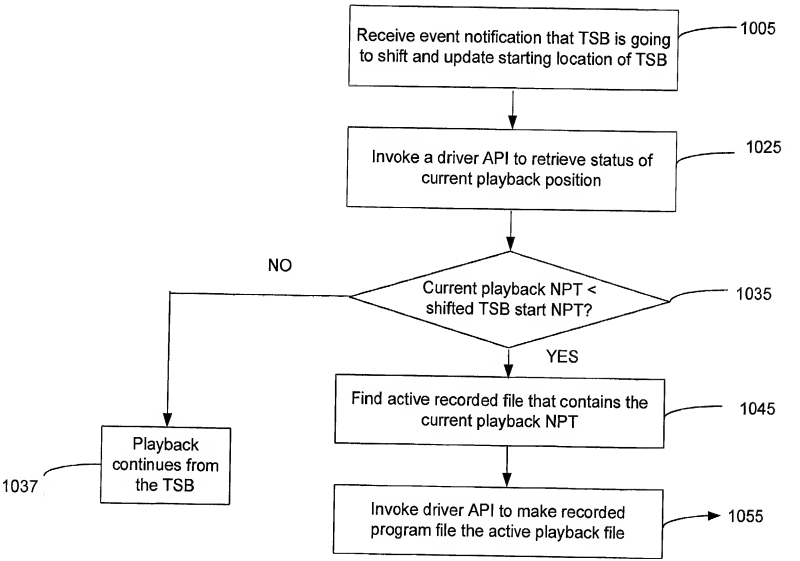
Receive event notification that TSB is going to shift and update starting location of TSB
1005
Invoke a driver API to retrieve status of current playback position
1025
Current playback NPT < shifted TSB start NPT?
1035
NO
YES
Find active recorded file that contains the current playback NPT
1045
Invoke driver API to make recorded program file the active playback file
1055
Playback continues from the TSB
1037

FIG. 10C

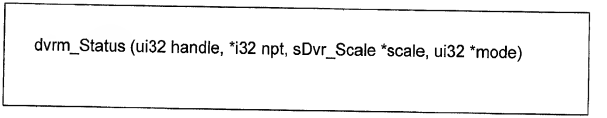

FIG. 10D

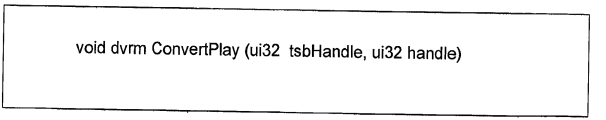

FIG. 10E

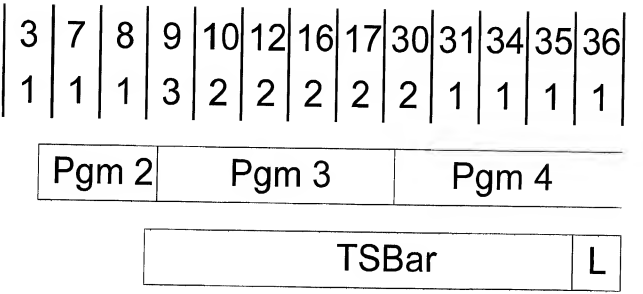
3 7 8 9 10 12 16 17 30 31 34 35 36
1 1 1 3 2 2 2 2 2 1 1 1 1
Pgm 2
Pgm 3
Pgm 4
TSBar
L

FIG. 11A

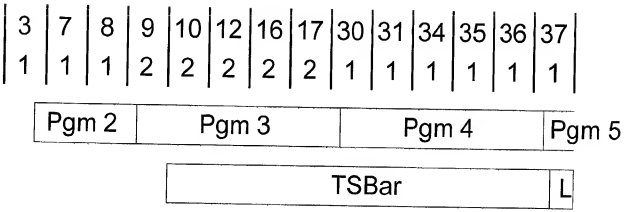
3 7 8 9 10 12 16 17 30 31 34 35 36 37
1 1 1 2 2 2 2 1 1 1 1 1 1
Pgm 2
Pgm 3
Pgm 4
Pgm 5
TSBar
L

FIG. 11B

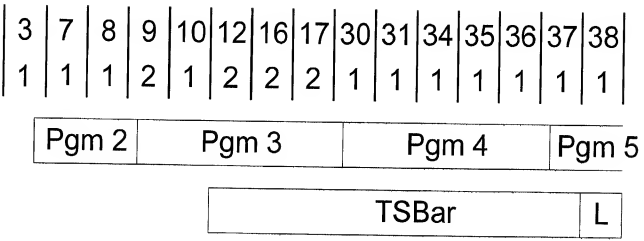
3 7 8 9 10 12 16 17 30 31 34 35 36 37 38
1 1 1 2 1 2 2 2 1 1 1 1 1 1 1
Pgm 2
Pgm 3
Pgm 4
Pgm 5
TSBar
L

FIG. 11C

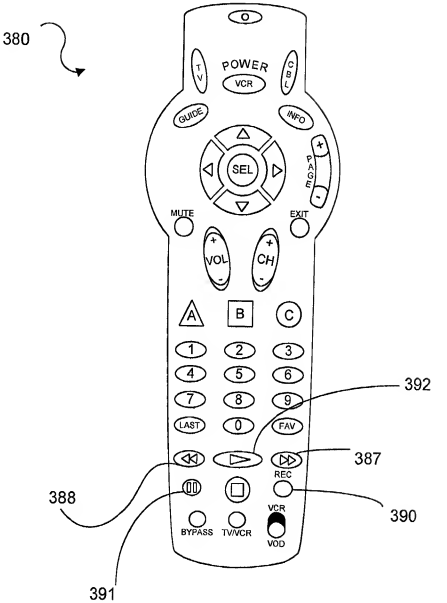
380
POWER
TV
VCR
CBL
GUIDE
INFO
SEL
PAGE
MUTE
EXIT
VOL
CH
A
B
C
1
2
3
4
5
6
7
8
9
LAST
0
FAV
REC
BYPASS
TV/VCR
VCR
VOD
392
387
388
390
391

FIG. 12

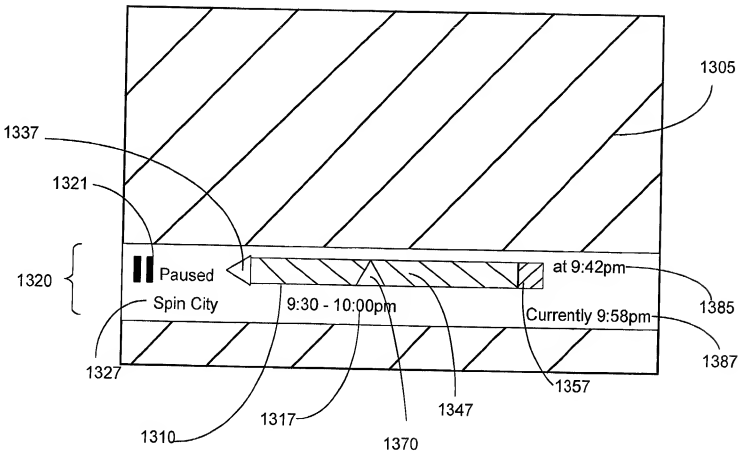
1305
1337
1321
1320
Paused
Spin City
9:30 - 10:00pm
at 9:42pm
Currently 9:58pm
1385
1387
1327
1357
1310
1317
1347
1370

FIG. 13A

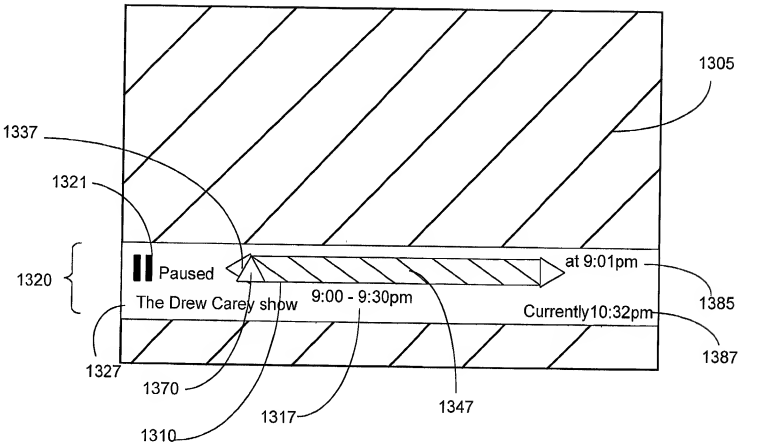
1305
1337
1321
1320
Paused
at 9:01pm
1385
The Drew Carey show
9:00 - 9:30pm
Currently10:32pm
1387
1327
1370
1317
1347
1310

FIG. 13B

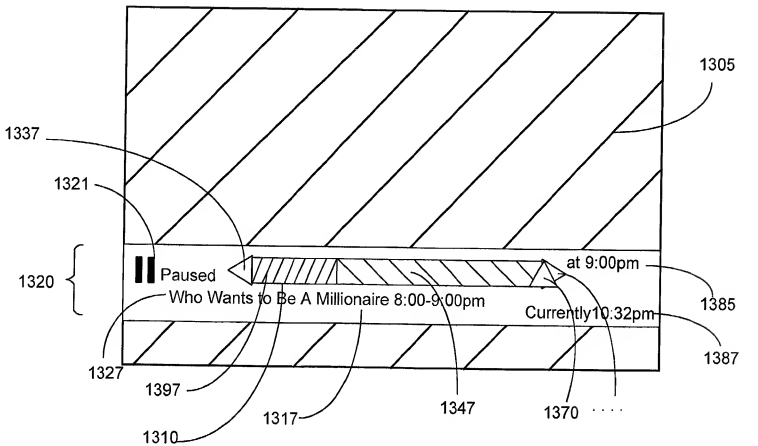
1305
1337
1321
1320
Paused
Who Wants to Be A Millionaire 8:00-9:00pm
at 9:00pm
1385
Currently10:32pm
1387
1327
1397
1317
1347
1370
1310

FIG. 13C

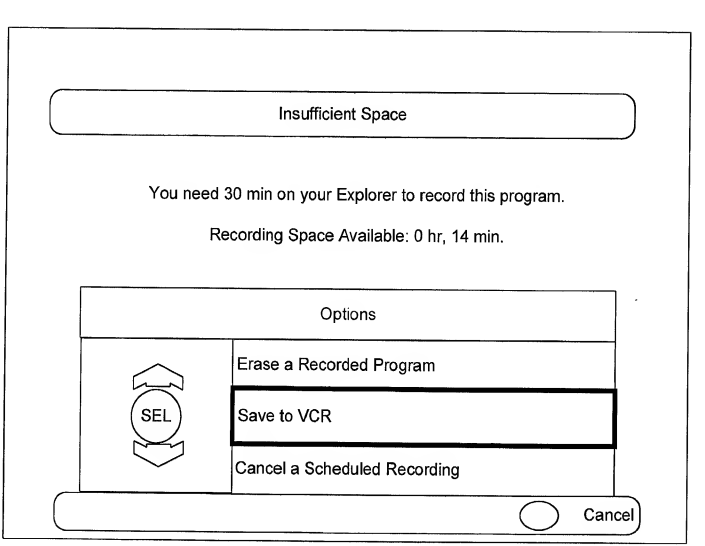
1400
Insufficient Space
You need 30 min on your Explorer to record this program.
Recording Space Available: 0 hr, 14 min.
Options
SEL
Erase a Recorded Program
Save to VCR
Cancel a Scheduled Recording
Cancel

FIG. 14